

Early Miocene fish from eastern Saudi Arabia

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Synopsis

Fish remains collected from early Miocene (Burdigalian marine chronology, middle Orleanian European land-mammal age equivalent, c. 17–19 Ma) continental deposits at Ad Dabtiyah, Saudi Arabia, can be referred to the family Cyprinidae and, possibly, to the Centropomidae. Teeth resembling those found in certain members of the family Labridae are also present.

Introduction

The fish remains were recovered from a continental white, pebbly, calcareous grit thought to be laterally equivalent to the basal deposits of the nearby marine Dam Formation (see Whybrow, McClure & Elliott, this issue, p. 371). In a preliminary report on the vertebrate fauna from the Saudi Arabian Miocene (Hamilton *et al.* 1978: table 1), the fish described here were erroneously stated to have been collected from the Jabal Midra ash-Shamali locality.

Register numbers refer to the collections of the Department of Palaeontology, British Museum (Natural History), London.

Systematic description

Subclass **OSTEICHTHYES** Huxley, 1880

Superorder **OSTARIOPHYSI** Sagemehl, 1885

Family **CYPRINIDAE** Bonaparte, 1837

Fig. 54

The Cyprinidae is a family of essentially freshwater species, a very few of which have a limited tolerance of brackish water.

The family is represented by a single, well-preserved pharyngeal tooth, P.61555. Judged from the nature of its basal attachment area and from the unworn occlusal surface, it was probably an unattached replacement tooth.

The ornate cusp pattern on the occlusal surface is most unusual (Fig. 54) and cannot be matched with that from any extant species represented in the Zoological collections of the British Museum (Natural History), nor with any species which has been described in the literature. Thus it is impossible to suggest an infrafamilial taxon to which the fossil might be allied.

Gayet (*in* Thomas *et al.* 1982: 116) identified cyprinid pharyngeal teeth from Lower Miocene deposits of the Al-Sarrar region (Eastern Province, Saudi Arabia) as derived from fishes referable to the genera *Barbus* and *Labeo*, with certain of those from the former taxon closely resembling median row teeth of *Barbus bynni*, an extant Nilotic species. The presence of *Barbus* and *Labeo* in Miocene deposits of Saudi Arabia supports, according to Gayet, Menon's (1964) suggestion that these fishes '... entered Africa (from Asia) as late as Plio-Pleistocene times'. The presence of a presumed *Barbus* from the Upper Miocene of Tunisia (Greenwood 1972), however, would appear to weaken that argument. None of the cyprinid fossil evidence available so far would seem to indicate, as Gayet suggested, either the routes or the dispersal pattern of the family, if indeed there was dispersal on this scale. Those questions are more likely to be elucidated by evidence ultimately obtained from a detailed phylogenetic analysis of living taxa. For the moment it would seem preferable only to use the fossil record as indicative of cyprinids occurring in both Africa and Saudi Arabia during the Miocene.



Fig. 54 Lower pharyngeal tooth from a cyprinid fish in lateral (left) and anterior (right) views. Bar = 1 mm. Early Miocene, Ad Dabtiyah, Saudi Arabia.

Superorder ACANTHOPTERYGII Gouan, 1770

Group PERCOMORPHA Bleeker, 1859

Family ?CENTROPOMIDAE Poey, 1865

An extensively damaged and incomplete neurocranium, P.61556, is referred tentatively to the Centropomidae, on the basis of its overall proportions taken in combination with the shape and proportions of individual skull bones.

The skull is elongate and slender and is noticeably narrow across the otico-occipital region. The supraoccipital is long-based and protracted anteriorly, thereby entirely and widely separating the elongate parietals, and also, but more narrowly, the frontals over the greater part of their medial faces. The exoccipital is an elongate and expansive bone with the foramen for the occipitospinal nerve situated immediately above the buttress extending upwards from the exoccipital facet.

In all these features the morphology of the fossil skull resembles that in extant *Lates* species (the African and Indo-Pacific, predominantly freshwater, representatives of the family) more closely than it does the neurocranial form in any *Centropomus* species (the American, and predominantly marine-brackish water representatives) or in *Psammoperca waigiensis* Cuvier & Valenciennes, a coastal marine centropomid of the Indo-Pacific area; see Greenwood (1976) for details and figures. It differs, however, in the great forward extension of the blade-like anterior supraoccipital prolongation. In no extant centropomid species does the supraoccipital separate more than the posterior third to quarter of the frontals. Likewise, in none of the serranid or percichthyids (the other presumed basal percoids) I have examined does the supraoccipital extend forward beyond that level.

The bones present and recognizable in the fossil are: the left and right frontals in part (those portions medial to the frontoparietal crests), the supraoccipital (missing its crest and the ventral portion of its posterior median extension), the parietals in part (the bone medial to the crest), the greater part of the right epioccipital, virtually the entire right exoccipital, the posterior region of the right prootic (but lacking its ventral margin), part of the dermethmoid, and the proximal part of the right lateral ethmoid.

Based on comparisons with skulls from *Lates calcarifer* (Bloch) and *Lates niloticus* (L.), it is estimated that the fossil skull, when entire, measured c. 10 cm from the anterior tip of the vomer to the ventral rim of the basioccipital condyle. It would thus be derived from a fish of about 30–35 cm standard length.

Part of a right dentary, P.61557 (that region of the bone immediately anterior to its separation into an ascending coronoid and a horizontal lower limb), is also thought to be derived from a centropomid fish. In its gross morphology, and in having small tooth scars densely packed into a broad alveolar surface, this dentary closely resembles that found in extant *Lates* species. It is probably from a fish of about the same size as that from which the skull was derived.

When compared with the dentary in specimens of extant *Lates* species of comparable size, the fossil is more robust and the alveolar surface is, relatively, somewhat wider.

The distal end of a proximal dorsal fin radial (pterygiophore), P.61558, compares closely with the third pterygiophore in the anterior dorsal fin of *Lates*. It is difficult to estimate the size of the individual from which the fossil came, but certainly it would not have been of more than 35–40 cm standard length.

A fragment from the proximal end of a spinous fin ray, P.61559, could also be derived from a centropomid fish within the size range 30–35 cm standard length.

Many extant species of the Centropomidae are known to be euryhaline; a few species are apparently confined to marine habitats, and some of the African species are apparently confined to fresh waters, with a number physiographically restricted to lakes.

Remains of a *Lates* species are recorded by Gayet (*in* Thomas *et al.* 1982: 116) from the Lower Miocene of the Al-Sarrar region, Eastern Province, Saudi Arabia.

Material of indeterminate origin

Two small teeth, P.61560, with molariform crowns, cannot be referred with certainty to any taxon. In their gross morphology they resemble a type of pharyngeal tooth frequently found in members of the Labridae, a family whose living members are exclusively marine.

Superficially these teeth do bear some resemblance to those from the parasphenoidal and basihyal tooth plates in members of the mormyrid genus *Hyperopisus*. However, on closer examination of the gross morphology, overall proportions and details of wear pattern, they are quite unlike those found in extant *Hyperopisus* specimens.

One tooth is squat, its maximum height (2 mm) is equal to the greatest diameter of its subcircular crown. The occlusal surface is slightly convex, with a well-defined wear facet occupying about one-third of its area; the entire surface slopes gently into the plane of its greatest diameter.

The other tooth is more elongate, its height measured from the crown to the lowest point of the neck preserved is 4.5 mm, and the maximum and minimum crown diameters are 2.0 mm and 1.5 mm respectively. Almost the entire occlusal surface is worn, the wear plane sloping to one side across the narrow diameter of the crown.

The third specimen of indeterminate origin, P.61561, is a small fragment of bone which resembles the head region of a percoid pleural rib.

References

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